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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/559,710	12/07/2005	Sebastian Kanne	R.305558	1888

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EXAMINER

MCGRAW, TREVOR EDWIN

ART UNIT	PAPER NUMBER
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3752

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/28/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary	Application No. 10/559,710	Applicant(s) KANNE ET AL.	
	Examiner Trevor McGraw	Art Unit 3752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/07/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear to the Examiner in line 4 of Claim 10 as to what Applicant is claiming when using the terminology "on the other via". It is further unclear to the Examiner as to what Applicant is claiming when using the terminology "on the back side of" in line 8 of Claim 10.

Furthermore, Claim 10 recites the limitation "the injection pressure" in line 8 of Claim 10. There is insufficient antecedent basis for this limitation in the claim. Examiner suggests making proper reference to the limitation "the injection pressure" to ensure proper Claim antecedence.

In line 3 of Claim 11, it is unclear to Examiner what "(lower) end" is referring to.

In line 5 of Claims 12 and 13, it is unclear to Examiner what "injection pressure (high pressure)" is referring to.

In Claim 13, line 5 it is unclear to Examiner what "injection pressure (high pressure)" is referring to.

In line 2 of Claims 16 and 17, it is unclear to Examiner what "(lower) region" is referring to.

In line 5 of Claims 16 and 17, it is unclear to Examiner what "(upper) end face" is referring to.

In line 4 of Claims 18, 19 and 20, it is unclear to Examiner what "injection pressure (high pressure)" is referring to.

In line 2 of Claims 21, 22 and 23, it is unclear to Examiner what "(further) leakage gap" is referring to.

In line 3 of Claims 21, 22 and 23, it is unclear to Examiner what "injection pressure (high pressure)" is referring to.

In lines 4 and 7 of Claims 24, 25 and 26, it is unclear to Examiner what "injection pressure (high pressure)" is referring to.

In line 1 of Claims 27, 28 and 29, it is unclear to Examiner what "union nut (clamping nut)" is referring to.

In line 5 of Claims 28 and 29, it is unclear to Examiner what "on the other" is referring to.

Appropriate clarification of the aforementioned issues is solicited from Applicant.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 10-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Kappel et al. (DE 4306073).

In regard to Claims 10-29, Kappel et al. (DE 4,306,073) teaches an injector for fuel injector systems of internal combustion engines, in particular direct injection diesel engines, where the injector has a piezoelectric actuator (P) located in an injector body (GH) and is held in contact with the injector body (GH) on one side (Figure 1) and has a sleeve like booster piston (DK) having an inner chamber (KA2), a nozzle body which is joined to the injector body (GH) and has at least one nozzle outlet opening (EO), a stepped nozzle needle (VN) that is guided axially displaceable in the nozzle body (VK) and a second spring (RF) is disposed inside the booster piston (DK) where the second spring (RF) with the injection pressure acting on the back side of the nozzle needle (VN) keep the nozzle needle in the closing position and a control chamber (KA1) is embodied on the end toward the nozzle needle (VN) of the booster piston (DK) and communicates with at least one leakage gap (KS1, KS2) where the leakage gaps (KS1, KS2) have hydraulic communication between the inner chamber (KA2) of the booster piston (DK) at injection pressure and with a fuel supply (SP) that is also at injection pressure, the nozzle needle (VN) is guided in the inner chamber (KA2) of the booster piston and is urged in the opening direction by the fuel located in the control chamber (KA2) where the booster piston (DK) is actuated by the piezoelectric actuator is spatially or spaced directly with the nozzle needle (VN) so that the nozzle needle (VN) is fitted with a rear region (HK) that has a larger diameter than a region of the nozzle needle (VN) toward the nozzle outlet (EO) into the inner chamber (KA2) of the booster piston (DK). The

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diesel fuel injector of Kappel et al. also teaches where the nozzle body (VK) adjoins the injector body (GH) on the face end in the flow direction and the piezoelectric actuator (P) extends as far as the end toward the nozzle body (VK) of the injector body (GH) where the piezoelectric actuator (P) is centered in an axially cylindrical recess (LA) of the injector body (GH) in such a way that an annular chamber is created between the outer wall of the piezoelectric actuator (P) and the inner wall of the cylindrical recess of the injector body (GH) where the annular chamber communicates hydraulically directly with the fuel supply (SP) that is at injection pressure and the annular chamber (Figure 9) extends into the region of the booster piston (KA3) axially adjoining the piezoelectric actuator (P) and where the inner chamber (KA2) of the booster piston (DK) communicates hydraulically with the annular chamber and the fuel supply (SP) and the pressure booster (DK) is guided in the nozzle body (VK) with a leakage gap that is created between the annular chamber and the control chamber at injection pressure.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10, 16, 17, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kappel et al. (DE 4,306,073) in view of Bart (US 4,022,166) and further in view of Fuessner (DE 3,519,945).

In regard to Claims 10, 16 and 17, Kappel et al. (DE 4,306,073) for at least the aforementioned reasons as described and taught above discloses the claimed invention except for a compression spring concentrically surrounding the booster piston located in a lower region of the annular chamber associated with the booster piston where the compression spring is braced toward the piezoelectric actuator on a collar of the booster piston and toward the nozzle outlet on a rear end face of the nozzle body so the piezoelectric actuator and the booster piston are kept in contact with one another by non-positive engagement. Bart (US 4,022,166) teaches that it is known to have a compression spring concentrically surrounding a booster piston located in a lower region of an annular chamber associated with a booster piston where the compression spring is braced toward the piezoelectric actuator on a collar of the booster piston and toward the nozzle outlet on a rear end face of the nozzle body so the piezoelectric actuator and booster piston are kept in contact with one another by non-positive engagement (Figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Kappel et al. with the concentric spring, booster piston, collar and piezoelectric actuator arrangement of Bart (US 4,022,166) in order to provide a means for keeping the piezoelectric actuator out of positive engagement with the booster piston to avoid undesired electrical conductivity between the metallic booster piston and piezoelectric actuator which prevents material fatigue over an extended period of time due to electrical embrittlement of the metallic booster piston which ultimately affects the components performance.

In regard to Claims 10, 28 and 29, Kappel et al. (DE 4,306,073) for at least the aforementioned reasons as described and taught above discloses the claimed invention except for a union nut securing the nozzle body to the injector body and a cylindrical gap between the outer wall of the nozzle body and the inner wall of the union nut where the cylindrical gap communicates hydraulically via recesses machined into the nozzle body on one side with the annular chamber and on the other with the cylindrical pressure chamber. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the nozzle body and the injector body of the present invention separate and connected with a union nut in such a manner to create a cylindrical gap between the outer wall of the nozzle body and the inner wall of the union nut where the cylindrical gap communicates hydraulically via recesses machined in the nozzle body on one side with the annular chamber and on the other with the cylindrical pressure chamber, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179. It is also of note to Applicant that it is old and well known in the art to have a union nut that secures the nozzle body of a fuel injector to the injector body of a fuel injector where a cylindrical gap between the outer wall of the nozzle body and the inner wall of the union nut where the cylindrical gap communicates hydraulically via recesses machined into the nozzle body on one side of the annular chamber and on the other with the cylindrical pressure chamber as taught by Fuessner (DE 3,518,945) making the Claims (emphasis on Claims 10, 28 and 29) of the present invention obvious over Kappel et al. (DE 4,306,073) in view of Fuessner (DE 3,518,945) .

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. D'Arrigo (US 6,766,965), Wilmers (US 4,437,644), Pauer (US 2006/0169802), Coldren et al. (US 5,947,380).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trevor McGraw whose telephone number is (571) 272-7375. The examiner can normally be reached on Monday-Friday (2nd & 4th Friday Off).

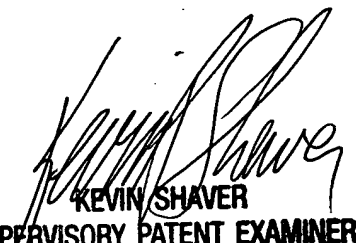
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Scherbel can be reached on (571) 272-4919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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Art Unit 3752

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